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The Demographics, Motivations and Derived Experiences of Users of Massively Multi-User Online Graphical Environments

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Abstract

Online survey data were collected from 30,000 users of Massively Multi-User Online Role-Playing Games (MMORPGs) over a three year period to explore users' demographics, motivations and derived experiences. Not only do MMORPGs appeal to a broad age range (M_{age}= 26.57, range = 11-68), but the appeal is strong (on average 22 hours of usage per week) across users of all ages (r = -.04). An exploratory factor analysis revealed a five factor model of user motivations - Achievement, Relationship, Immersion, Escapism and Manipulation - illustrating the multi-faceted appeal of these online environments. Male players were significantly more likely to be driven by the Achievement and Manipulation factors, while female players were significantly more likely to be driven by the Relationship factor. Also, the data indicated that users derived meaningful relationships, salient emotional experiences as well as real-life leadership skills from these virtual environments. MMORPGs are not simply a pastime for teenagers, but a valuable research venue and platform where millions of users interact and collaborate using real-time 3D avatars on a daily basis.

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Selling virtual weaponry and real estate for a living, coordinating fifty people in a dragon-slaying expedition over a period of 5 hours, marrying someone you'll never meet, and switching gender for several hours at a time. These are a few of the myriad of virtual phenomena that occur every day in online digital constructs known as MMORPGs - Massively-Multiplayer Online Role-Playing Games. Everyday, millions of users (Woodcock, 2004) participate in these online environments. The increasing prevalence of these environments makes it crucial to understand the ways in which we use, interact and live in these digital constructs.

Although many of the theoretical implications of social interaction in Collaborative Virtual Environments (CVE) have been explored in the artificial confines of Virtual Reality (VR) research laboratories (Bailenson & Yee, 2005; Zhang & Furnas, 2002; Bailenson, Beall, & Blascovich, 2002; Slater, Sadagic, Usoh, & Schroeder, 2000; Normand, et al., 1999; Leigh, DeFanti, Johnson, Brown, & Sandin, 1997; Mania & Chalmers, 1998), MMORPGs provide a naturalistic setting where millions of users voluntarily immerse themselves in a graphical virtual environment and interact with each other through avatars (visual representations of users in a digital environment) on a daily basis. The opportunity to study what people actually do when they choose to be in a virtual environment with thousands of other people cannot be overstated, and that is the underlying rationale for the current studies.

Existing research on computer or video gaming tends to focus on two main areas: the negative effects of playing video games and whether video games can be used for pedagogical purposes. For example, an extensive line of research has focused on demonstrating that violent

video-games increase real-life aggression (Ballard & Lineberger, 1999; Anderson & Dill, 2000; Anderson & Bushman, 2001), and survey studies have shown positive correlations between preference for video games and aggressiveness (Scott, 1995; Funk et al., 2002), delinquency (Anderson & Dill, 2000), and lower perceived self-conduct (Funk, Buchman & Germann, 2000); however, the generalizability of short-term measures of aggression in experimental studies and the inability to infer causality in survey studies is a concern in this line of research (Griffiths, 1999). One notable exception is a longitudinal experimental study conducted by Williams and Skoric (2005). The findings in this study did not support the assertion that playing a violent video game will cause substantial increases in real-world aggression.

Another line of research has explored the pedagogical uses of video games among elementary school students (Ko, 2002), high-school students (Ravenscroft & Matheson, 2002), and college students (Moreno & Mayer, 2002). Video games can also enhance sensorimotor tasks (Fery & Ponserre, 2001), visual acuity and attention (Green & Bavelier, 2003), as well as aid in the recovery of motor skills after physical trauma (Taylor & Berry, 1998). In fact, some have explicitly argued that video games should be considered as platforms for learning (Gee, 2003).

What are MMORPGs?

Both lines of above research have mostly relied on single-player games, but as the ubiquity of high-speed internet connections and powerful computer processors have increased with a steady decrease in cost, the paradigm of computer gaming has changed dramatically, and MMORPGs are the vanguard of a new generation of computer games that takes advantage of the accessibility of the internet and the graphical processing capability of standard computer

systems.

MMORPGs are a new paradigm in computer gaming (see Table 1). By definition, MMORPG users are part of a persistent world of up to 2000 other concurrent users (Sony Online, 2003). A persistent world is a world that exists independent of the users. In stand-alone games and local network games, the world only exists when the game is started by the user, and thus is dependent on the user "activating" it. In an MMORPG, the world exists before the user logs on, and continues to exist when the user logs off. More importantly, events and interactions occur in the world (driven by other users) even when the user is not logged on to the persistent world. To accommodate the sheer number of users, the worlds in MMORPGs are vast and varied (in terms of terrain, flora, fauna, and local inhabitants). In contrast, the worlds of most stand-alone and local network games are simplistic and can only accommodate fewer than 16 concurrent players in a space that can be traversed in a few minutes.

Table 1

Attributes of 3 Gaming Paradigms

Attribute	Stand Alone Games	Local and Wide Area Network Games	MMORPGs
Exemplars	*Solitaire, Snood, SimCity, Risk*	*Diablo II, Unreal, Age of Empires*	*EverQuest, Star Wars Galaxies*
Cost for Player	Software	Software	Software + Subscription
# of Players in World	1	1-16	0-2000
Persistent World	No	No	Yes
Mode of User Agency	Direct / God-Like Control	One or Several Avatars	Personal Avatar

Size/Scope of World	Abstracted Game Board	Abstracted or Limited Worlds	Naturalistic Worlds / Galaxies, not abstracted
Player Social Interaction	None	Combat Strategy Driven	Rich, collaborative, social interactions

On a simplistic level, MMORPGs could be thought of as a scenic chat room with a variety of interactive tasks. Users experience cities, jungles, and even the falling rain or snow in rich real-time 3D graphics, and communicate with each other using typed chat and templated gestures and expressions. They interact with the world through a combination of mouse-driven interfaces and typed commands, and partake of a large number of varied activities that increase in complexity, reward and time involvement which typically operate on a random-ratio reinforcement schedule. These activities revolve around character advancement and translate into a functional advantage in terms of the mechanics of the world, whether this is combat capability, social status, avatar appearance, geographic knowledge, equipment quality or even cooking skills. Whereas the first few MMORPGs focused heavily on combat-oriented advancement, recent MMORPGs have offered more diverse forms of advancement. For example, in *Star Wars Galaxies*, one can become a skilled musician, chef, hair stylist, animal tamer, or politician.

Most forms of advancement in MMORPGs require increasing cooperation or dependency on other users, oftentimes mutually beneficial. In *Star Wars Galaxies*, scouts hunt and harvest hides and meat from animals which they can sell to artisans who need those resources to craft basic items. Most combat professions need the complementary support of each other as they tackle more and more difficult creatures or enemies that in turn hold larger rewards. But ultimately, each user decides which form of advancement they will pursue, and the richness and complexity of the environment eliminates the need for super-ordinate goals or storylines. Every

user is motivated by a different combination of the possible rewards. The result is that adventures, stories, and most importantly for the purpose of the current work, meaningful relationships between users emerge during interaction. Functional constructs within the environment facilitate these social networks – combat groups (temporary collaboration between a few users), guilds (persistent user-created membership organizations), and ideological alliances (agreements between guilds or "racial" groups).

Given how different MMORPGs are from stand-alone and local network games, perhaps a better comparison is with live-action or table-top role-playing games (RPGs) or Multi-User Domains (MUDs) - the textual predecessors of MMORPGs. MMORPGs are different from RPGS in that RPGs do not occur in persistent game worlds. Events only occur in the RPG game world when players have convened in a physical location. Also, this physical constraint means that it is not possible to convincingly change one's representation in an RPG the way it is possible in an MMORPG - especially in terms of gender and race. Furthermore, the physical constraints of RPGs makes it more likely that RPG players know each other when compared with MMORPG players. MMORPGs are in fact much more similar to MUDs than other genres of video games in that both have persistent game worlds where players can interact using avatars.

Currently, there is very little quantitative research on MMORPGs or MUDs. While researchers like Turkle (1995) and Bruckman (1993, 1995) have contributed a great deal to our understanding of the users of MUDs, their approaches were more qualitative and relied on anecdotal stories, interview data, or personal experience. For example, Turkle (1995) illustrated how digital self-representation in MUDs allowed users to understand the fluid, dynamic and post-modern nature of their identities. Almost no quantitative studies of MUDs exist. One of the few quantitative studies of MUDs explored how sociability and skepticism towards computer-

mediated communication influenced social behavior within MUDs (Utz, 2000). Also worth noting is a multi-methods study of LambdaMOO by Schiano & White (1998) that illustrated, among other things, that LambdaMOO users preferred stable, integrated identities as opposed to the fluid, fragmented identities Turkle suggested. Existing research on MMORPGs has mostly relied on analysis of publicly available data. For example, Castronova (2002) has used the e-Bay sales transactions of virtual items to show that the economy of EverQuest is quantifiable and has a higher gross domestic product than some developing countries, and to show the inequity between the value of the virtual male and female body (Castronova, 2003). Griffiths, Davies & Chappell (2003) has also aggregated online poll data at websites catering to EverQuest players to provide the basic demographics and preferences of EverQuest players. Very few studies have used primary sources of data. One of the few is a study by Axelsson & Regan (2002) that explored the impact of group affiliation on social behavior in the MMORPG *Asheron's Call*. The study found that group affiliation makes people more social both online and offline.

Over the course of three years, I have collected online survey data from 30,000 MMORPG players. Preliminary qualitative data from open-ended questions were used to form theoretical questions about the motivations and relationship formation of MMORPG users among other issues (Yee, 2004). In that previous paper, I argued that the architecture of these environments facilitate relationship formation, and are windows into and catalysts in existing relationships in the material world. The goal of the current work was to complement these previous findings by providing a more rigorous quantitative analysis on who uses MMORPGs, what motivates their use, and the salience and impact of the experiences that emerge in these environments. Moreover, this paper attempts to articulate the many opportunities to study social identity, social interaction and relationship formation in these environments.

Demographics and Usage

The apparent focus of existing video game research on adolescent users creates the illusion that video game players are a youth subculture, and that video games are a teenage pastime of no important consequence apart from their ability to increase real-life aggression. For example, the entire volume of a recent special issue of the Journal of Adolescence (Vol. 21-1) was devoted to the negative effects of video games on adolescent gamers. The following quotes from that issue illustrate the assumption that adolescents are the primary consumers of video games or that video games somehow impact adults in an entirely different way that isn't worth mentioning or studying.

> "Video games have become one of the favorite activities of American children" (pg. 5).
>
> "The rise and popularity of video and computer games as a leisure phenomenon has become an ever-increasing part of many young people's day-to-day lives" (pg. 1).
>
> "A lot of youths are playing violent video games for many hours per week. When large numbers of youths (including young adults) are exposed to many hours of media violence (including violent video games), even a small effect can have extremely large societal consequences" (pg. 120).

In spite of the fact that the average age of computer and video game players is 30 (Entertainment Software Association, 2005), the articles in the special issue seem to perpetuate the assumption that mainly children and adolescents play video games. In fact, studies in video game violence in general have mainly focused on adolescent gamers (see Griffiths, 1999 for review). This stereotype is also described by other researchers. For example, Griffiths, Davies and Chappell (2003) note that "the image of a typical gamer is seen as socially negative and remains firmly within a youth subculture" (pg. 81).

In a recent study that challenged this stereotype (Griffiths, Davies & Chappell, 2003), the demographics and usage patterns of MMORPG users were explored by analyzing online poll data on 2 websites catering to players of the MMORPG *EverQuest*. That data showed that the game clientele was very much an adult profile rather than the stereotypical adolescent player. Although the online polls consisted of large samples (upwards of 10,000 responses), a weakness with the study is that the data analysis was bound by the range and number of answer choices used in the third-party polls. For example, instead of allowing open-ended responses to age or hours played per week, only several ranges were offered. Furthermore, because each question was asked on a separate poll, it was not possible to explore demographics and preferences in relation to each other for each individual user – such as exploring age and gender differences in usage patterns. Therefore, it was crucial to perform a more extensive analysis of the demographics and usage patterns of MMORPG users.

Motivations for Use

Articulating motivational differences among different users is the precursor to understanding the emergence of more complex behaviors and interactions in these environments, as well as providing a framework to differentiate one user from another. To ignore these individual motivational differences is tantamount to claiming that all MMORPG users are motivated by the exact same reasons. Most video game studies to date, however, have relied on the traditional effects model that don't take into account the fact that people choose the media they consume and the varied reasons for doing so (Sherry, 2001; Sherry & Lukas, 2003).

Without an empirical framework with which to identify individual motivational differences among MMORPG users, it is impossible to meaningfully differentiate users or understand their interactions with other users in the world. This framework provides the

foundation to explore whether different sections of the demographic are motivated differently, and whether certain motivations are more highly correlated with usage patterns or in-game preferences or behaviors.

There have been no systematic attempts to create a motivational framework for MMORPG users, but an exploratory framework for Multi-User Dungeons (MUD) users has been proposed by Bartle (1996). Bartle's proposed "player types" are derived from his experience in creating and managing these online textual worlds rather than empirical data, and provides valuable insight as well as a framework to test and build upon. Bartle proposed four types - Achievers, Socializers, Explorers, and Killers - each having different in-game preferences and motivations for using the MUD environment. For example, Explorers are users who are interested in understanding the mechanics and rules of the system as well as mapping out the world, while Socializers are users who enjoy chatting, interacting and role-playing with other users.

Even though it is important to be able to differentiate the motivations among MMORPG users, there has been no empirical attempt to identify what those motivations might be. This present study attempted to create an empirical framework for understanding individual motivational differences among MMORPG users using an exploratory factor analysis. Also of interest was how these motivational differences varied across different demographic sections and how they correlated with usage patterns.

Derived Experiences

The impact that MMORPGs have on their users - in terms of social interactions, emotional investment and acquisition of social skills - will be collectively referred to as *derived experiences* in this paper. Even though there exists very little empirical research on MMORPGs,

there are many reasons to expect that complex social interactions and social phenomena emerge in these environments. Indeed, the literature in MUDs is abundant with examples of how intimate relationships and emotionally salient experiences derive from even textual online environments. For example, Turkle (1995) has documented romantic relationships, supportive friendships, and even wedding ceremonies in MUDs. The incidence of a "cyber rape" in a MUD has also been documented and widely-discussed (Dibbell, 1993). The debate it sparked illustrated the amount of emotional investment users placed in these worlds. MMORPGs are MUDs on a massive scale with incredible visual and behavioral richness. Therefore, MMORPGs should foster complex social phenomena and interactions among users.

The literature also suggests several reasons for why this might occur. For example, Walther (1996) suggested that one of the reasons why hyperpersonal interactions – interactions that are more intimate, more intense, more salient because of the communication channel – occur in CMC is because participants can reallocate cognitive resources typically used to maintain socially acceptable non-verbal gestures in face-to-face interactions and focus on the structure and content of the message itself. The message itself then comes across as more personal and articulate. Indeed, in virtual worlds where we do not have to constantly worry about how we look and behave, we would be able to dedicate more cognitive resources to the message itself. Walther also suggested that as interactants respond to personal messages with equally personal and intimate messages, the interactions intensify through reciprocity. In other words, the process provides a positive feedback cycle.

Walther's themes resonate with McKenna and Bargh's more recent work (2000) suggesting four factors that enable positive social interactions online. First, people have greater anonymity online. Second, the importance of physical appearance is greatly reduced. Third, the

Internet transcends the problems of physical space and wide dispersion. And finally, users have greater control over the time and pace of their interactions. Again, all of these factors, except for perhaps the last one, are present in MMORPGs, and suggest why enhanced social interactions occur in these online environments.

Behavioral confirmation may also be at work. People become what we expect them to be (Snyder, Tanke & Berscheid, 1977). Given the literal reality of "knights in shining armor" and the fact that users can choose to be as attractive as the world allows, users may become more friendly and more sincere with each other because of the heroic attributes their avatars project.

The present study used quantitative survey data to explore three issues that relate to the salience and impact of experiences and social interactions in MMORPGs. First of all, the significance and salience of the relationships that form in MMORPGs were examined. Secondly, the degree of emotional investment in the environment was considered. Finally, whether real-life leadership skills could be acquired in the online environment was explored through self-report measures.

A series of online surveys were used to study the demographics, motivations and derived experiences among MMORPG users over a 3 year period, between the years 2000 and 2003. During this period, over 30,000 MMORPG users were surveyed, with approximately 2000-4000 respondents in each survey phase. In the following sections, the methods used and data collected on three main aspects of MMORPG use are presented. First, the demographic composition of current MMORPG users and their usage patterns are presented to illustrate the wide appeal of these immersive environments. Second, an exploratory factors analysis of the different motivators of usage is presented. Finally, the salience of the relationships and emotional experiences users derive from these environments is examined.

General Methodology

Certain methods were common to all three of the sections discussed in the previous paragraph. These common methodologies are presented here.

MMORPG Selection.

The approximate number of active subscribers to existing MMORPGs were publicly available (see Woodcock, 2003), and it was usually clear which MMORPGs comprised the bulk of all MMORPG users. From the year 2000 to 2003, the following MMORPGs together comprised approximately 75% of the North America MMORPG market with regards to share of active subscribers: *Ultima Online*, *EverQuest*, *Dark Age of Camelot*, and *Star Wars Galaxies* as calculated using available subscription data (Woodcock, 2003; CorpNews, 2004). Therefore, users of these environments were targeted for this study.

Participant Recruitment

MMORPG users were recruited through online websites known to cater to them. These included the Lore, Stratics, and IGN Vault Networks that have sub-sites for different MMORPGs. These websites typically had a news list on their front page with more recent listings at the top, and each website provided an option to submit news and information to the editors of the news list. A concise overview of the goals and scope of the study together with a link to the online survey itself would be sent to the editors via the news submission option provided. Publication of the overview was never guaranteed, and once the news item was listed, its duration on the news list was dependent on how many news items the news list could hold and how many new news items were added over the course of the next few days.

Procedure

MMORPG users who followed the link would be presented with a brief summary of the intentions and scope of the project, and would have to follow another link on that page to the survey itself. After providing informed consent, respondents answered online surveys consisting mostly of multiple-choice questions in a binary or Likert-style scale using radio buttons. Certain continuous variables such as age or hours played per week were recorded using text-fields. Answers to open-ended questions were recorded using text-area boxes. While open-ended questions were used in the study, only data collected from close-ended questions, using Likert-type rating response options, are presented in this paper, with the exception of age and hours played per week which were collected using open-ended text fields.

Each survey took about 5-10 minutes to complete. Respondents were not paid or compensated for their participation. Because respondents were given the actual goals of the study and not a cover story and there were no experimental manipulations, there was no need for debriefing. Duplicate responses were found and deleted by comparing IP addresses. The rate of duplicate responses was trivial - 8 out of 3100 in a recent survey phase.

A new survey was usually publicized every 2-3 months between the years 2000-2003. Surveys targeted all MMORPGs of interest simultaneously. The typical response rate was 2000-4000 for each survey. In each survey, respondents were asked to provide their email if they were interested in participating in future surveys. At the beginning of each survey phase, in addition to the recruitment at websites, respondents already in the database were contacted via email to notify them of the new survey in which they could participate. Methods specific to each section will be provided in the corresponding section.

Section One: The Demographics and Usage Patterns of MMORPG Users

Method

Survey items implemented through standardized HTML form items (radio buttons and text fields) were used to gather responses to basic demographic information: gender, age, marital status, occupational status, hours of usage per week, and whether the user participated with a family member or romantic partner. Age and hours of usage per week were the only two survey items implemented with open-ended text fields, while all other survey items were implemented with set response choices. In the tables and graphs throughout the paper, the age variable is collapsed into five ranges for ease of presentation. All survey items used in this section can be found in Appendix C.

Results and Discussion

The data collected over the 3 year period of the study will be presented in thematic rather than chronological order. While survey data was collected from users who were active in different MMORPGs, the focus of this paper is on the demographics and motivations of a representative MMORPG user group rather than on comparing the differences among users of different MMORPGs. As such, between-game differences will not be presented[1]. A different number of respondents participated in every survey phase (typically 2000-4000 respondents participated in each survey), and findings are drawn from different survey phases. Therefore, the sample size for the results, graphs, tables below are not all identical. The majority of respondents were male (85.4%, $n = 5547$). The average age of the respondents was 26.57 ($n = 5509$, $SD = 9.19$); the median was 25, with a range from 11 to 68. The lower and upper quartile boundaries were 19 and 32 respectively (see Figure 1 for the ages of both genders). Thus, only about 25% of MMORPG users are teenagers and MMORPGs have cross-generational appeal.

[1] There were fluctuations in demographics among different games. Hours played per week ranged from 16-24 hours. Female players ranged from 9% to 20%. Age means ranged from 23 to 30. It is hard to interpret the underlying differences because different games are different on many dimensions and are at different points in their life-cycle.

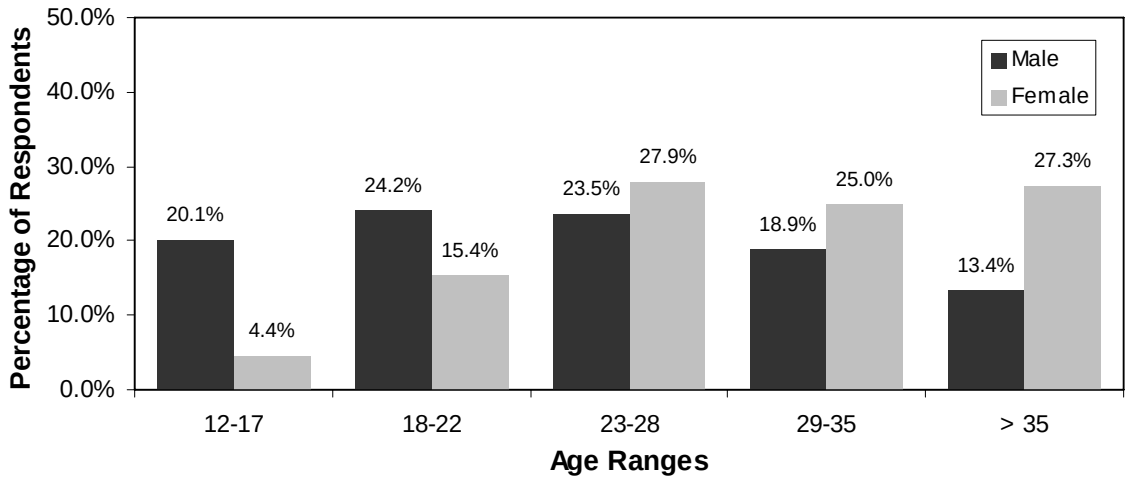

Figure 1. Age Distribution by Gender (N_{male} = 4705, N_{female} = 788).

Female players (*M* = 31.72, *SD* = 10.11, *n* = 788) were significantly older than male players (*M* = 25.71, *SD* = 8.73, *n* = 4705), *t*(5491) = -17.46, $p < .001$, *r* = .22. While the cause of this age difference may be hard to pinpoint, one potential explanation lies in how male players and female players were introduced to MMORPGs. 26.9% of female players (*n* = 420) were introduced to the game by their romantic partner (boy/girlfriend, fiancé/e, or husband/wife), compared with 1.0% of male players (*n* = 1778), $p < .001$. Since people with romantic partners tend to be older, this form of recruitment may have disproportionately increased the average age of female players.

Other findings also demonstrate that MMORPG users are not primarily adolescent students. It was found that 50.0% of respondents (*n* = 2846) worked full-time, while another 22.2% were full-time students. A more detailed breakdown by gender is shown in Table 2. Of particular interest is that 13% of female players were homemakers (13.3%, *n* = 438), which is a striking juxtaposition to the stereotypical image of the male teenager; however, it is exactly this coexistence of male teenagers and middle-aged homemakers in MMORPGs that highlight the

wide appeal of these environments. Furthermore, a substantial portion of respondents had established families of their own. This is demonstrated by the substantial portion of respondents who were married (36.3%, $n = 2846$) or had children (22.1%, $n = 2846$). Thus, the overall demographic composition of MMORPG users is quite diverse, and does not consist primarily of adolescents. In fact, it also includes college students, early adult professionals, middle-aged homemakers, as well as retirees.

Table 2

Occupational Distribution by Gender

Gender	Full-Time Student	Part Time Student or Work	Full-Time Employed	Unemployed	Homemaker	Retired
Male (*n*=2383)	23.9%	12.8%	50.9%	10.1%	1.5%	0.7%
Female (*n*=438)	12.8%	11.4%	48.0%	12.1%	13.3%	2.5%

It is important to establish the wide appeal of MMORPGs for two reasons. The first and foremost is to counter the stereotype that video gamers are part of a youth subculture, implying that these online environments only appeal to a small slice of the general population. Secondly, establishing the diverse demographics of MMORPG users makes the following data on usage patterns more poignant in showing the strength of the appeal of these environments. On average, respondents spent 22.71 hours ($n = 5471$, $SD = 14.98$) each week in their chosen MMORPG. The median was 20 hours per week. The lower quartile and upper quartile boundaries were 11 and 30 respectively. The distribution of hours of usage per week (see Table 3) also shows that about 8-9% of respondents spent 40 hours or more per week in these environments.

Table 3

Distribution of Hours of Usage Per Week by Gender

Gender	0-10 hrs	10-20 hrs	20-30 hrs	30-40 hrs	40-50 hrs	50-60 hrs	> 60 hrs
Male (n = 4739)	24.5%	34.0%	20.6%	11.7%	4.6%	2.0%	1.8%
Female (n = 791)	22.6%	30.2%	23.3%	13.9%	5.5%	2.7%	1.9%

The strong appeal of these environments is further highlighted by the finding that 60.9% of respondents (n = 3445) had spent at least 10 hours continuously in an MMORPG. This finding is more surprising given that there is only a weak correlation between age and hours of usage per week (r = -.04). In other words, the appeal of the environment is comparable for both high-school students, middle-aged professionals, and retirees.

Another interesting aspect of usage involves users who participate in an MMORPG with their romantic partner or family members. These users are using separate computer systems, each with their own licensed copy of the software, and collaborating to achieve goals in the online environment. It was found that 15.8% of male players (n = 1589) and 59.8% of female players (n = 311) participated in the environment with a romantic partner, while 25.5% of male players and 39.5% of female players participated with a family member. Thus, not only do MMORPGs have wide and strong appeal, but the likelihood of co-usage with individuals who are emotionally close to the user is also quite high. The stereotypical video gamer is characterized as socially withdrawn and playing alone, but the co-usage findings together with the fact that the MMORPG user is in an environment with hundreds of other users show that MMORPG users clearly do not fit this stereotypical profile. The substantial portion of MMORPG users who have a romantic partner or family member who also participates in the same MMORPG opens up the potential to

explore how their virtual interactions differ or impact their real-life interactions.

The demographic data of MMORPG users challenge the stereotypical image of video gamers as part of youth subculture, and forces us to realize that adolescents are not the only users we should be paying attention to. But more importantly, the data demonstrate that MMORPGs appeal to a very wide demographic and that this appeal is strong and elicits high time investment from users.

Section Two: Framework for Motivational Differences in Usage

Given that these online environments have such wide and strong appeal, we will now shift our attention to understanding what makes MMORPGs so appealing. What motivates MMORPG users to participate and stay in these worlds for, on average, more than half of a work week? In an early survey targeting EverQuest users, responses to the open-ended question "Why does EverQuest appeal to you?" varied tremendously in their scope and focus:

> "Overall, I enjoy taking on the role of a happy/silly little gnome who eats bugs."
>
> "I just love being able to advance a character and accomplish some goals in making a powerful adventurer."
>
> "It is fun because of the player interaction. You can talk to real people, play the game with friends, etc."

This section presents the results of an exploratory factor analysis with the goal of creating a framework of user motivations, and which provides the foundation to examine age and gender differences in usage in a rigorous fashion.

Method

Qualitative data from open-ended questions analyzed in previous work (Yee, 2004), as well as information drawn from online forum discussions and Bartle's (1996) player types were used to generate a list of 40 items (see Appendix A) in an attempt to encompass the variation and range of motivations observed. Examples of these items include: "I like to feel powerful in the game," and "I like to be immersed in a fantasy world." Respondents indicated their agreement to each of the 40 items on a 5-point scale (1=strongly disagree, 3=neutral, 5=strongly agree). Respondents also indicated their age, gender, and an approximation of the hours spent per week in their MMORPG.

Results and Discussion

A total of 6675 responses (N_{male} = 5939, N_{female} = 736) were received. The mean age of this sample was 26.70 (SD = 8.84). An exploratory factor analysis (EFA) using maximum likelihood factor extraction was performed to arrive at a parsimonious representation of the associations among the 40 items. EFA assumes that each measured variable is a linear function of one or more common factors and an error of measurement factor. Common factors are latent variables that influence more than one measured variable and are presumed to account for the correlations among measured variables. In other words, the goal of an EFA is to identify the latent constructs which are presumed to account for the observed correlations among the measured variables. A parallel analysis[2] revealed that the first eight eigenvalues expected for random normally-distributed data (1.15, 1.15, 1.13, 1.11, 1.10, 1.09, 1.09, 1.08) fell below the observed eigenvalues from the reduced matrix of the actual data (4.67, 3.34, 2.32, 1.90, 1.79, 1.42, 1.22, 1.16). Thus eight factors were determined to be included in the model as their

[2] Because of the potential unreliability of the Kaiser criterion and scree test (Fabrigar, Wegener, MacCallum, Strahan, 1999), a parallel analysis, as recommended by methodologists (Fabrigar et al., 1999), was used to determine the number of components to be extracted

eigenvalues suggested that they explained more variance than due to chance alone. Together these eight factors accounted for 44.5% of the overall variance. An oblique rotation (Promax, kappa=4) was used to reflect the inherent correlations between the factors[3], and the eight resulting factors retained 31 of the original 40 items (see Appendix B). Most loadings were in excess of 0.55 and no secondary loadings exceeded 30% of the primary loadings[4]. Because of the domain-specific wording of several items, these factors may not be easy to interpret for individuals not familiar with MMORPGs, so a brief description of each factor follows.

Factors

The "Relationship" factor measures the desire of users to interact with other users, and their willingness to form meaningful relationships that are supportive in nature, and which include a certain degree of disclosure of real-life problems and issues. The "Manipulation" factor measures how inclined a user is to objectify other users and manipulate them for his personal gains and satisfaction. Users who score high on the "Manipulation" factor enjoy deceiving, scamming, taunting and dominating other users. Users who score high on the "Immersion" factor enjoy being in a fantasy world as well as being "someone else". They enjoy the story-telling aspect of these worlds and enjoy creating avatars with histories that extend and tie in with the stories and lore of the world. The "Escapism" factor measures how much a user is using the virtual world to temporarily avoid, forget about and escape from real-life stress and problems. The "Achievement" factor measures the desire to become powerful in the context of the virtual environment through the achievement of goals and accumulation of items that confer power. The "Lead" factor measures how much a user desires to lead others in the context of the world. Users

[3] As Fabrigar et al. (1999) noted, all psychometric data should be assumed to be inter-correlated, and an oblique rotation should always be used. In cases where the data is orthogonal, the oblique rotation will produce the same solution.

[4] So for example, an item with a primary loading of .56 did not have any other loadings higher than .17.

who score high on the "Learn" factor feel that they have learned things about themselves and real-world social dynamics from the MMORPG. And finally, the "Solo/Group" factor measures whether a user prefers individual or team achievements.

Because only two items loaded onto the "Lead", "Solo/Group" and "Learn" factors, it was impossible to assess the reliability of these factors. Furthermore, it was noted that the items contained in the "Lead" and "Solo/Group" factors were not truly primary motivations for using an MMORPG as much as personality preferences within the context of the virtual environment, and the "Learn" factor was an effect and not a cause for using MMORPGs. In other words, it seems to make little sense to say that a user participates in an MMORPG because they like to play alone or because they prefer to lead rather than follow. On the other hand, it does make sense to say that a user participates in an MMORPG because they want to escape from reality or because they enjoy meeting and forming relationships with other users. Thus, the "Lead", "Learn" and "Solo/Group" factors seemed to describe how people behave in MMORPGs rather than why they use MMORPGs. For these reasons, the "Lead", "Learn" and "Solo/Group" factors were not considered to be motivation factors and discarded before the remainder of the analysis.

Relation of Factors with Demographics and Usage

Not only do these factors provide an empirical framework for measuring and categorizing individual differences in motivations, but they also provide a meaningful way to examine gender, age and usage differences. Scores for each factor were generated for each of the 6675 respondents using the regression method. All five factors differed significantly between male players and female players (see Table 4).

In particular, male players scored significantly higher than female players on the Achievement and Manipulation factors, while female players scored significantly higher on the

Relationship, Immersion and Escapism factors. This pattern of gender differences imply that male players and female players are motivated to participate in MMORPGs for entirely different reasons. These findings resonate with Deborah Tannen's work (1990) that men and women value different aspects of interpersonal interaction. Tannen argued that women value intimacy and personal conversations in relationships whereas men valued working with others rather than talking with them. This gender difference is reflected in the data. Female players prefer to relate to other players, while male players prefer to work together to achieve goals. While some scholars have argued that generalizable gender differences do not exist with regards to computer gaming preferences and doing so inadvertently implies separate forms of media for boys and girls (Cassell & Jenkins, 1998), MMORPGs show that it is possible to articulate gender differences and provide a media form that may appeal equally to both genders but in different ways.

Table 4

T-tests of factor scores between male (n = 5939) and female (n = 736) respondents

	Male		Female				
Factor	*M*	*SD*	*M*	*SD*	*t*	*p*	*r*
Relationship	9.08	2.15	10.00	2.21	-11.05	< .001	.15
Manipulation	5.18	1.86	4.39	1.48	11.16	< .001	.15
Immersion	6.87	1.49	7.09	1.49	-3.85	< .001	.05
Escapism	6.81	1.25	7.00	1.22	-3.48	< .001	.05
Achievement	8.06	1.48	7.22	1.49	14.70	< .001	.20

With regard to how these motivations related to usage patterns, among male players, age was inversely correlated with the Manipulation (r = -.33, p < .001) and Achievement (r = -.27, p < .001) factors, implying that younger male players tend to objectify both the environment and

other users for their own personal gains. Among female players, age was inversely correlated with the Manipulation (r = -.15, p < .001) and Immersion (r = -.13, p < .001) factors.

Hours of usage per week was found to correlate with the Relationship factor for both male players (r = .22, p < .001) and female players (r = .22, p < .001). Hours of usage per week also correlated with the Escapism factor for both male players (r = .16, p < .001) and female players (r = .14, p < .001). Further analysis revealed that users in the top quintile of the Relationship factor spent on average 29.50 (SD = 13.50) hours per week in the environment while users in the bottom quintile spend on average 19.70 (SD = 18.08) hours per week - a difference of almost 10 hours per week (t[2653] = -15.76, p < .001, r = .29). These findings highlight the highly social nature of these environments. In fact, MMORPGs attract a diverse demographic who are drawn to the environment to socialize and interact with other users.

Section Three: Meaningful Relationships, Salient Experiences and Skill Transfer in MMORPGs

The salience and impact of the relationships and experiences in MUDs have been documented by Turkle (1995) through extensive interviews with individual users, and other researchers (Walther, 1996; McKenna & Bargh, 2000) have provided explanations for the psychological underpinnings of the heightened intimacy and intensity of CMC interactions. This section provides data on three issues: 1) significance of relationships formed in the MMORPG environment, 2) degree of emotional investment, and 3) whether real-life skills can be acquired in these online environments.

Method

The survey items used were implemented using standard HTML radio buttons using a set response format. All items used are shown in Appendix C. Most response choices were in a

dichotomous "yes / no" format. For 1) significance of relationships formed in the environments, users were asked to indicate whether they had disclosed personal information to online acquaintances that they did not disclose to real-life acquaintances, as well as whether their online friendships were comparable to or better than their real-life friendships. For 2) degree of emotional investment, users were asked in several questions whether the most salient emotional events (positive and negative) over the past week and past month occurred in the online environment or in real life, as well as whether they would consider themselves addicted to the environment. And finally, for 3) transference of real-life skills, users were asked to self-assess whether their leadership skills had improved from their experiences in the online environment.

Results and Discussion

In the following sets of data, several results are broken down by gender and age cohorts. The number of respondents in the cross-tabulation of gender and age cohort will be presented in Table 5 to avoid clutter in the tables below.

Table 5

Cross-tabulation of number of respondents across gender and age cohorts

Gender	12-17	18-22	23-28	29-35	> 35	Total
Male	546	646	736	686	349	2963
Female	23	57	111	106	119	416

Meaningful Relationships

The current study found that 22.9% of male players (n = 2991) and 32.0% of female players (n = 421) had told personal issues or secrets to their MMORPG friends which they have never told their real-life friends (see Figure 2). While self-disclosure was higher among younger

users, the data show that it is quite prevalent even among users over the age of 22.

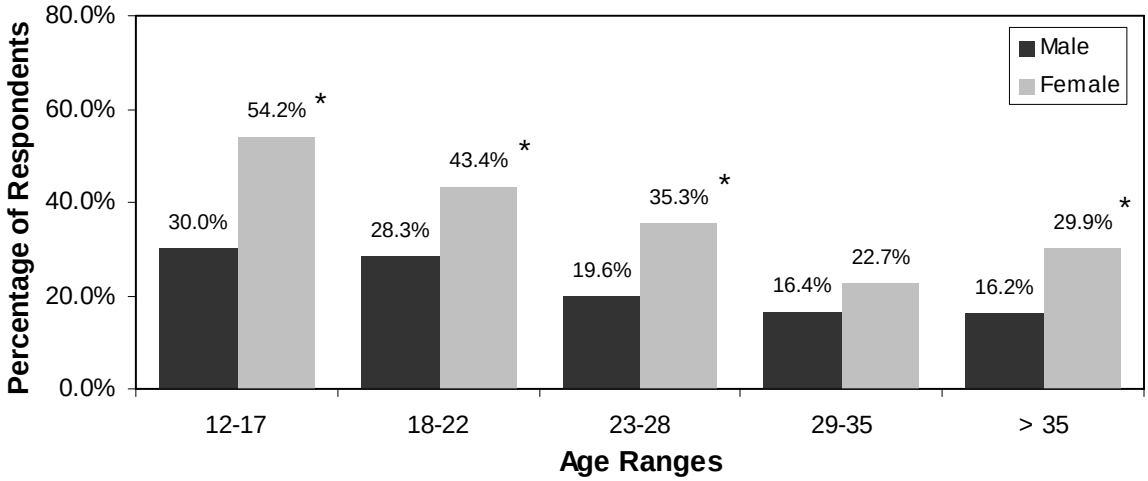

Figure 2. Percentages of respondents by age and gender who have told personal issues or secrets to their MMORPG friends which they have never told their real-life friends.

* $p < .05$ in gender comparison

Respondents were also asked to compare the quality of their MMORPG friendships with their real-life friendships. 39.4% of male players ($n = 2971$) and 53.3% of female players ($n = 420$) felt that their MMORPG friends were comparable or better than their real-life friends (see Figure 3).

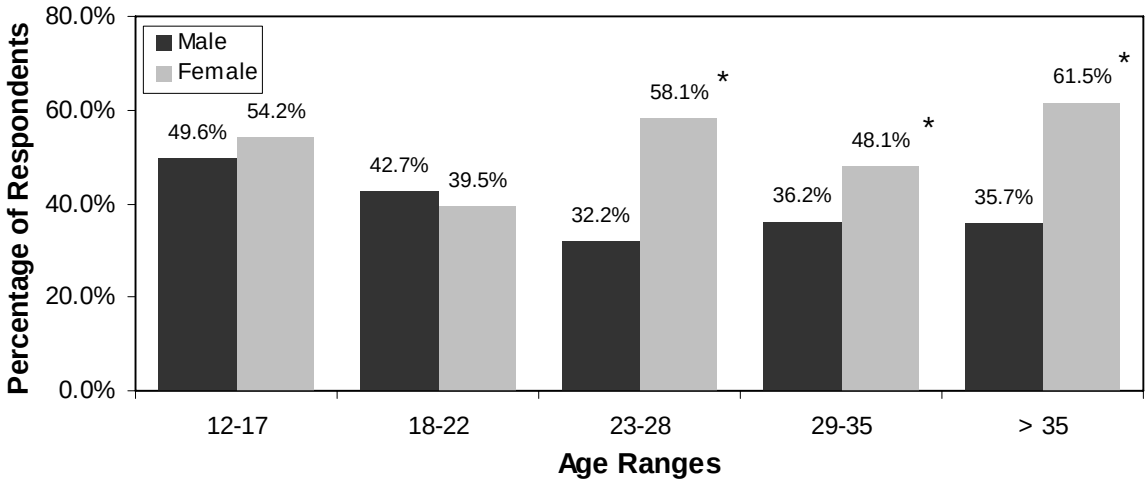

Figure 3. Percentages of respondents by age and gender who agreed that their MMORPG friends were comparable to or better than their real-life friends

* $p < .05$ in gender comparison

Finally, 5.1% of male players ($n = 2991$) and 15.7% ($n = 420$) of female players had physically dated someone who they first met in an MMORPG (see Figure 4). Across these three sets of findings, a substantial portion of users across a broad age range have had meaningful social relationships in these virtual environments. What these three sets of findings make clear is that many users across all age ranges form meaningful relationships in MMORPGs.

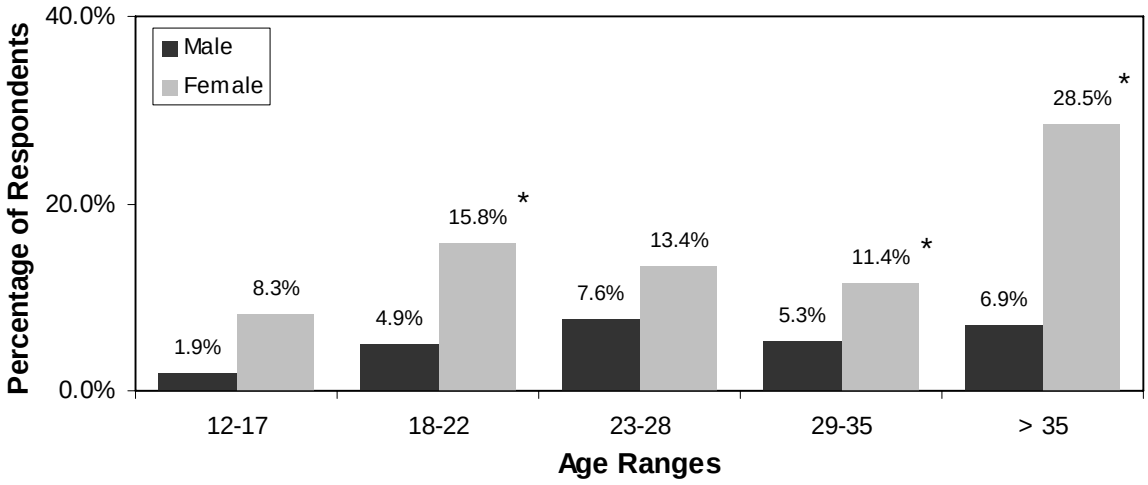

Figure 4. Percentages of respondents by age and gender who have physically dated someone they met in an MMORPG

* $p < .05$ in gender comparison

In addition to explanations for heightened intimacy provided by Walther (1996) and McKenna and Bargh (2000), another factor unique to MMORPGs may be facilitating the formation of relationships in these environments. Groups in MMORPGs often need to collaborate to achieve larger and riskier goals, such as exploring a dangerous lair. Roles that players must take on (close-range combat, ranged combat, support healer, etc.) in MMORPG environments are designed to be complementary in nature. All roles have strengths and weaknesses, and a successful group is one where all members take full advantage their own strengths while mitigating the vulnerabilities of their teammates. All members have to react to unexpected events and make split-second decisions while taking into account whether they can trust their teammates to provide crucial support as they become vulnerable. These scenarios require the users in a group to work together effectively under stressful circumstances. Many relationships grow out of or are augmented through these bonding experiences (online analogues

of boot camps) that occur with great frequency in MMORPGs.

Emotional Investment

The high time involvement of typical MMORPG users hints at a substantial level of emotional investment in the MMORPG environment. To get a more direct approximation for the degree of emotional investment in the MMORPG environment, respondents were asked to indicate whether the most positive or negative experience they had experienced over the period of the past 7 days or the past 30 days occurred in an MMORPG or in real-life (see Figures 5 and 6). The results show that a substantial portion of users derive experiences in these virtual environments that are more satisfying and rewarding than their real-life experiences. The data also show that this was also true for negative experiences. These findings highlight the high degree of emotional investment among many MMORPG users as well as illustrating the ability of these virtual environments to elicit a large amount of emotional investment.

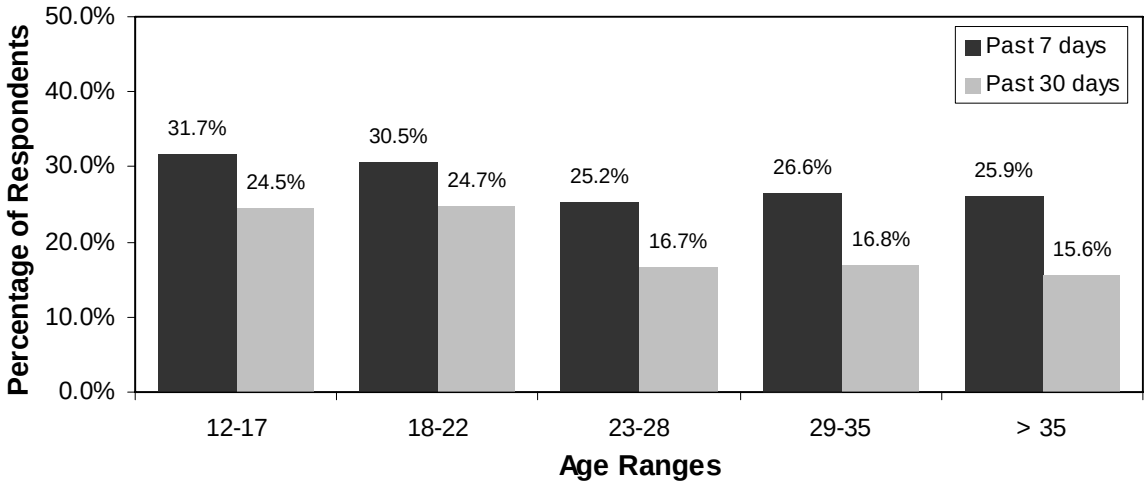

Figure 5. Percentages of respondents by age and gender for whom the most rewarding or satisfying experience over the past 7 or 30 days occurred in an MMORPG (N = 2170)

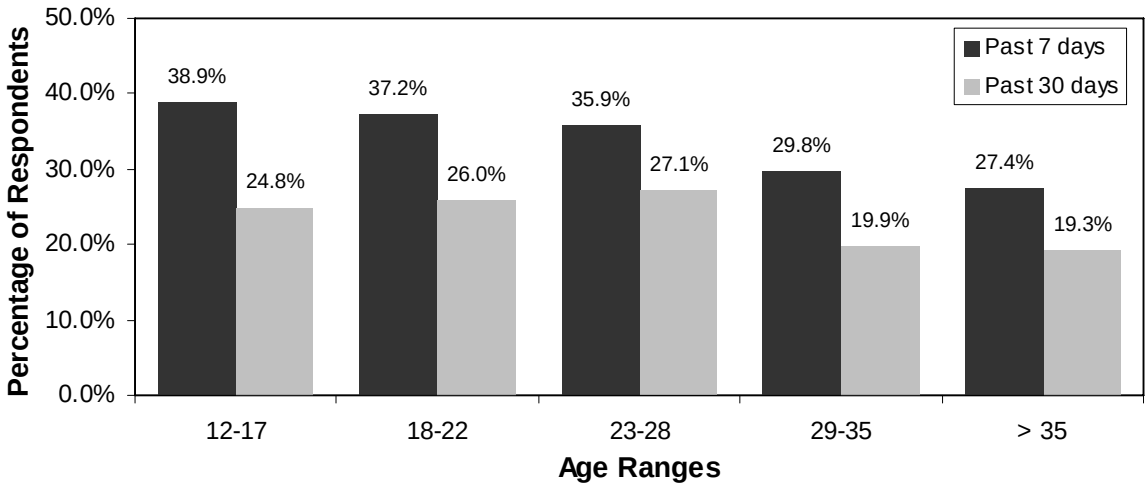

Figure 6. Percentages of respondents by age and gender for whom the most annoying or infuriating experience over the past 7 or 30 days occurred in an MMORPG (N = 2170)

There were no significant gender differences. Therefore, even though male players and female players are motivated to use the environment for different reasons, it appears that the experiences they have in these environments are equally salient. The data on negative emotional experiences together with the data on general usage patterns also suggest that even though users' experiences in these environments can be very negative, users are still willing to emotionally invest themselves in the environment. It is ironic that some users use the MMORPG environment to escape real-life stress but find even more frustration online.

As another approximation of the emotional investment of MMORPG users, respondents were asked to indicate whether they would consider themselves to be addicted to the MMORPG environment they participated in (see Figure 7). Rather than an actual clinical assessment of MMORPG users, the goal of this question was to ask users to gauge the level of their time and emotional investment in the environment. The results are revealing in that nearly half of respondents considered themselves to be addicted to the MMORPG environment, illustrating the

high degree of emotional investment users have in these environments as well as the tremendous appeal of these environments.

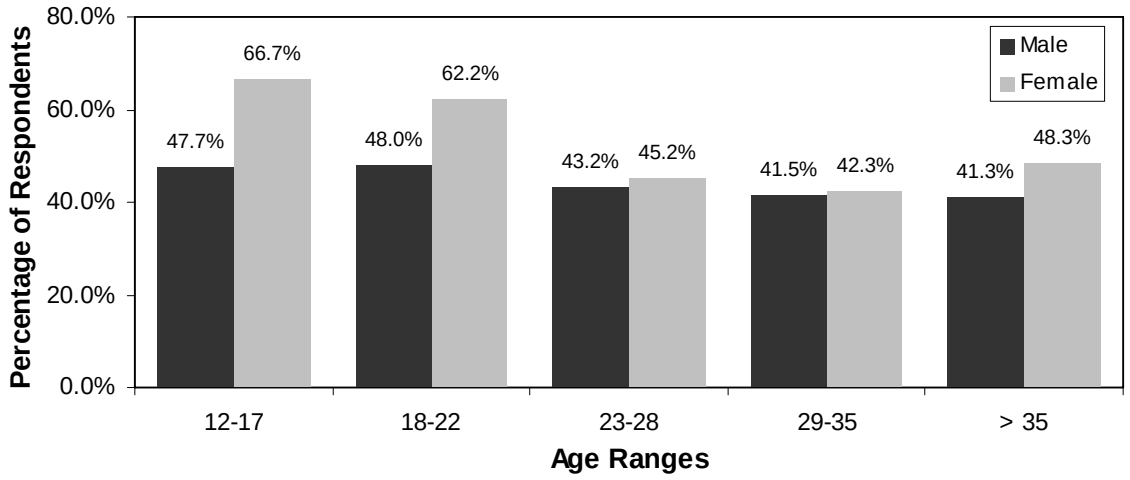

Figure 7. Percentages of respondents by age and gender who would consider themselves addicted to the MMORPG environment they participated in

Skill Acquisition and Transfer

Personal advancement in MMORPGs typically involves collaboration among groups of users in an attempt to achieve a challenging task. Thus, a prime candidate for acquired skills is leadership skills. In emergent groups within the MMORPG environment, leaders deal with both administrative as well as higher-level strategy issues, most of which arise and have to be dealt with spontaneously. Administrative tasks include: role assignment, task delegation, crisis management, logistical planning, and how rewards are to be shared among group members. Higher-level strategy tasks include: motivating group members, dealing with negative attitudes, dealing with group conflicts, as well as encouraging group loyalty and cohesion. These issues are even more salient in long-term social groups, such as guilds, which have formalized membership and rank assignments. In other words, MMORPGs provide many opportunities for short-term

and long-term leadership experiences.

Respondents were asked to self-assess whether their skills in three leadership areas had improved in real-life situations from their MMORPG experiences. These three areas were conflict mediation, group motivation, and persuasion when a change in goals was necessary. In addition, respondents were asked whether they had become more comfortable with leadership roles in real-life because of their experiences in an MMORPG. Across the four areas, a distinct portion of respondents credited MMORPG environments in improving their real-life leadership skills (see Figure 8). Respondents who felt that they had learned a lot from their MMORPG leadership experiences were significantly younger than those respondents who felt they had learned a little or not at all (see Figure 9).

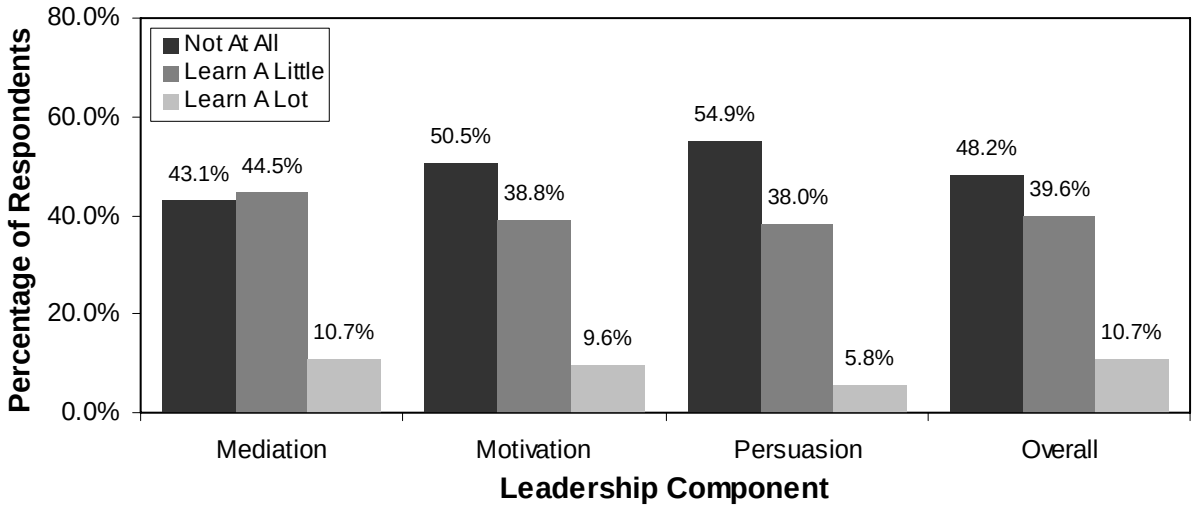

Figure 8. Self-assessment of improvement in real-life leadership skills

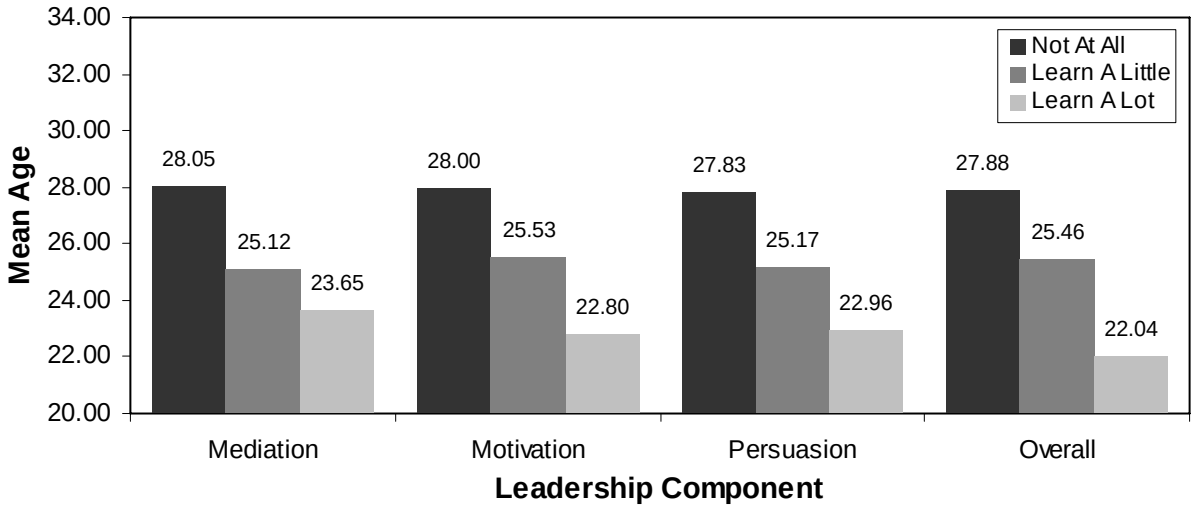

Figure 9. Age means across the different categories in the self-assessment of improvement in leadership skills.

These results are remarkable for MMORPG environments that were not designed to teach leadership skills, and have no structured pedagogical goals or curriculum. But more importantly, these findings demonstrate that real-life skills can be acquired or improved upon in these environments. Certainly, self-reported assessments are not robust assessments, but these findings lay the foundation for more controlled studies of the acquisition of complex social skills in these environments. The gradual deployment of remote collaboration tools (such as CVEs) in business settings (Defanti, 2000) makes it all the more important to understand how online leadership skills can be assessed and developed.

The findings in this section have shown that MMORPG users derive meaningful relationships, salient emotional experiences as well as acquire real-life social skills from these environments. Indeed, the stereotype of videos games as trivial past-times or as creators of violent teenage criminals serve only to hinder more fruitful research into how social identity and social relationships are being transformed in these emerging environments.

Discussion

A typical group in an MMORPG may be composed of a high-school student, a graphic designer in his 20's, a stay-at-home mom and her husband, all collaborating to achieve some common goal. There are very few activities, hobbies or games in real-life where you would find people with ages ranging from 11 to 69 interacting and collaborating to achieve shared goals. More importantly, many of these people dedicate half a work week to this virtual collaboration and interaction. MMORPGs have a strong multi-faceted appeal to a diverse demographic, motivating individual users in very different ways. Some users participate in the environment to make friends and form supportive social networks while others use the environment to become powerful through the achievement of goals. And not only are a substantial portion of users emotionally invested in these online environments, they also derive salient experiences from them, and the relationships they form in these environments are comparable to their real-life relationships. MMORPGs are uniquely social environments. In fact, there now exist massively multi-user online environments (such as There.com or Second Life) where the dominant activities are poetry readings, fashion shows, pop concerts, and even romantic encounters along star-lit beaches. In other words, the very same things that people do in real life.

The breadth of the data presented also allows us to describe specific user cohorts in fairly great detail. For example, we now know a great deal about female players in MMORPGs. Female players are typically introduced to the environment by a romantic partner and are older than male players in MMORPGs. This means that female players are typically interacting with male players significantly younger than them and this must be taken into account when examining how male players and female players may perceive social interactions in the environment differently. The data on motivations showed that female players participate in these

environments for reasons fairly different than those of male players. Female players are more likely to use the MMORPG environment to build supportive social networks, escape from real-life stress and to be immersed in a fantasy world. Female players do form stronger friendships than male players, but female players are not significantly more emotionally invested in the environment than male players. The overall picture is that female players, even though they tend to be older than male players and are motivated by entirely different reasons, find the same appeal and derive the same emotional salience and impact from these online environments.

Moreover, users under the age of 18 are almost all male (96.8%). The data on motivations show that male teenagers tend to objectify the environment and other users for their own personal gain. Out of all age cohorts, users under the age of 18 are most likely to feel that the friendships they have formed online were comparable or better than their real-life friendships, and were also most likely to self-report that the most positive or negative emotionally salient experience they have had in the past month as having occurred in the MMORPG environment rather than in real-life. This is also the age cohort that felt they had learned the most about leadership skills from the MMORPG environment. The appeal and emotional impact of MMORPGs on this age cohort point to future research in the use of MMORPGs for pedagogical purposes given that users are already acquiring valuable skills from non-pedagogical MMORPG implementations.

One major limitation of the current study is its reliance on a self-selected group of respondents. Of particular concern is that this self-selected group is composed of more serious or engaged players that may not reflect the MMORPG population in general. The studies presented here are probably skewed by sampling biases but given the large sample size are still likely to represent a substantial portion of MMORPG players. Also, overall sampling biases are likely to

impact frequency data (i.e., percentage of female players) but are less likely to impact correlational or inferential findings (i.e., gender or age differences) which typically are the focus of research questions in the social sciences. This is the same reason why gender differences in an experimental study that draw from an undergraduate sample (e.g., spatial rotation ability) are probably still generalizable even though undergraduates are highly unrepresentative of a population in general. Thus, even with its limitations, the survey methodology can still provide important insight to many questions that rely on inferential or correlational data. For example, these may include gender and age differences in motivations or determining the best predictors of problematic usage.

While MMORPGs are currently entertainment platforms, they present many lines of possible research for social scientists. What is the cultural function of the virtual wedding ceremony between two people who have never and will never meet in real life? Who is likely to choose avatars of the opposite gender and how does it affect their gender-identity or gender role? Do people in MMORPGs make friends or fall in love in the same way that people do in physical world? Can we derive revealing personality information from a user's behaviors in a virtual environment? What kinds of governing bodies or justice systems emerge in these virtual societies? Complex social phenomena are emerging in these worlds everyday, and most of them are completely unexplored.

Moreover, the structure and design of these environments make them good candidates for alternative uses for social scientists. For example, traditional personality assessment techniques are typically transparent and reactive. Because actions in massively multi-user online environments can be tracked unobtrusively by the server, every users' attitudes and personalities may be tracked using behavioral measures. And because users are personally invested in their

avatars and the environment, every decision they make is personally revealing. Moreover, the "true self" is both more accessible and better expressed in Internet settings than in face-to-face settings (Bargh, McKenna, & Fitzsimons, 2002), suggesting that behavioral measures in online settings might be particularly revealing. The length and frequency of utterances, as well as the breadth and depth of a user's social network can all be meticulously measured and tracked over long periods of time. This database of measures provides rich longitudinal profiles of individual users as well as how they rank amongst a large sample of other users. One could think of MMORPG environments as a gold-mine of personality data as well as a platform to develop unobtrusive personality assessment tools.

The connotation in the word "game" is heavy with triviality and the minimal (or negative) impact it has on "real" life. And because these environments are marketed as games, it is easy to assume those implications of the trivial nature of games are also true of MMORPGs; however the finding that users experience both positive and negative experiences in these environments that are comparable and sometimes more salient than their day-to-day real-life experiences reveals how misleading it is to label and think of these environments as trivial games, and it is also a denial of the rich complexity of these environments and the experiences that users are deriving from them.

There are many ways one can conceptualize MMORPG environments. They are places where alternate identities are conceived and explored. They are parallel worlds where cultures, economies, and societies are being created. They are environments where the relationships that form and the derived experiences can rival those of the physical world. They are new platforms for social science research. They are places where people fall in love, get married, elect governors, attend poetry readings, start a pharmaceutical business, and even commit genocide.

Whatever MMORPGs are, or will become, one thing is clear. They are not just games.

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Appendix A. The 40 items used in the motivations data.

1) I find myself having meaningful conversations with others.

2) I usually don't chat much with group members.

3) I have made some good friends in the game.

4) I find myself soloing a lot.

5) I like to say funny things in group/guild chat.

6) I talk to my friends in the game about personal issues.

7) Friends in the game have offered me support when I had a RL problem or crisis.

8) I am an effective group leader.

9) I would rather follow than lead.

10) I like to feel powerful in the game.

11) Doing massive amounts of damage is very satisfying.

12) I constantly try to set and reach goals.

13) I can't stand those people who only care about leveling.

14) It's very important to me to get the best gear available.

15) I try to optimize my XP gain as much as possible.

16) I'm fascinated by the game mechanics, and love charts and tables.

17) I research everything about a class before starting the character.

18) Class-balancing or realm-balancing issues do not interest me.

19) This game is too complicated.

20) I like wandering and exploring the world.

21) I would make maps if they weren't available.

22) I have learned things about myself from playing the game.

23) I understand real-life group dynamics much more after playing the game.

24) I like the escapism aspect of the game.

25) I like to be immersed in a fantasy world.

26) Playing the game lets me vent and relieve stress from the day.

27) Playing the game lets me forget some of the real-life problems I have.

28) I like to try out new roles and personalities with my characters.

29) The way I am in the game is the way I am in real life.

30) People who role-play extensively bother me.

31) I like the feeling of being part of a story.

32) I make up stories and histories for my characters.

33) I like to manipulate other people so they do what I want them to.

34) I like to dominate other characters/players.

35) I like to taunt or annoy other players.

36) I scam other people out of their money or equipment.

37) I beg for money or items in the game.

38) It's important to me to achieve things with as little help from other people as possible.

39) It's just a game.

40) I am uninterested in player-killing.

Appendix B – Loading of items on the 8 factors

Factor	Item	Loading
Relationship		
(α = .76)	I find myself having meaningful conversations with others.	0.57
	I have made some good friends in the game.	0.58
	I talk to my friends in the game about personal issues.	0.79
	Friends in the game have offered me support when I had a RL problem or crisis.	0.74
Manipulation		
(α = .73)	I like to taunt or annoy other players.	0.63
	I beg for money or items in the game.	0.46
	I like to dominate other characters/players.	0.65
	I like to manipulate other people so they do what I want them to.	0.59
	I scam other people out of their money or equipment.	0.61
Immersion		
(α = .63)	I like to try out new roles and personalities with my characters.	0.59
	People who role-play extensively bother me.	-0.53

	I like the feeling of being part of a story.	0.46
	I make up stories and histories for my characters.	0.63
Escapism		
(α = .62)	I like the escapism aspect of the game.	0.59
	Playing the game lets me forget some of the real-life problems I have.	0.65
	Playing the game lets me vent and relieve stress from the day.	0.52
Achievement		
(α = .67)	It's very important to me to get the best gear available.	0.61
	I try to optimize my XP gain as much as possible.	0.59
	I like to feel powerful in the game.	0.53
	Doing massive amounts of damage is very satisfying.	0.46
Lead		
	I am an effective group leader.	0.68
	I would rather follow than lead.	-0.70
Learn		
	I have learned things about myself from playing the game.	0.50
	I understand real-life group dynamics much more after playing the game.	0.58
Solo/Group		
	I find myself soloing a lot.	-0.58
	It's important to me to achieve goals with as little help from other people as possible.	-0.55

Appendix C – All survey items used in sections one and three.[5]

1) Gender: ○ Male ○ Female

2) Age: ____

3) Occupational Status:

○ I am working full-time

[5] These items were presented on different surveys. The order they are presented here corresponds to the order the corresponding results are presented.

- ○ I am a full-time student
- ○ I work part-time, and/or am student part-time
- ○ I am a stay-at-home-mom/dad
- ○ I am unemployed
- ○ I am retired

4) Marital Status:

- ○ Single
- ○ Engaged/Married

5) Do you have children?

- ○ Yes
- ○ No

6) Did someone introduce you to the game?

- ○ No, I read an ad or found out on my own.
- ○ My romantic partner (boy/girl-friend, fiancé/e, husband/wife) introduced me to game.
- ○ A friend introduced me to game.
- ○ A family member (excluding spouse) introduced me to game.

7) I spend about ___ hours each week playing the game.

8) I have played the game for 10 hours continuously or more.

- ○ Yes
- ○ No

9) Do you play the game with a real life romantic partner (boy/girl-friend, fiancé/e, husband/wife)?

- ○ No, I don't play the game with a romantic partner.

○ Yes, but we're seldom grouped.

○ Yes, and we're sometimes grouped.

○ Yes, and we're almost always grouped.

10) Do you play the game with a family member?

○ No, I don't play the game with a family member.

○ Yes, but we're seldom grouped.

○ Yes, and we're sometimes grouped.

○ Yes, and we're almost always grouped.

11) I've told personal issues to online friends which I have never told anyone in real life

○ Yes

○ No

12) I would consider myself addicted to the game

○ Yes

○ No

13) Some of my friends in the game are comparable to or better than my real-life friends.

○ Yes

○ No

14) I have physically dated someone who I first met in the game.

○ Yes

○ No

15) The most rewarding/satisfying experience I've had in the past 7 days was:

○ something that happened in the game

○ something that happened in real life

16) The most rewarding/satisfying experience I've had in the past 30 days was:

- ○ something that happened in the game
- ○ something that happened in real life

17) The most annoying/infuriating experience I've had in the past 7 days was:

- ○ something that happened in the game
- ○ something that happened in real life

18) The most annoying/infuriating experience I've had in the past 30 days was:

- ○ something that happened in the game
- ○ something that happened in real life

19) Do you feel that your ability to mediate or resolve in-group tension in real life has improved from your experiences in the game?

- ○ It hasn't helped my real life abilities at all.
- ○ It has helped my real life abilities a little.
- ○ It has helped my real life abilities a lot.

20) Do you feel your ability to persuade other people in real life has improved from your experiences in the game?

- ○ It hasn't helped my real life abilities at all.
- ○ It has helped my real life abilities a little.
- ○ It has helped my real life abilities a lot.

21) Do you feel your ability inspire and motivate other people in real life has improved from your experiences in the game?

- ○ It hasn't helped my real life abilities at all.
- ○ It has helped my real life abilities a little.

○ It has helped my real life abilities a lot.

22) Have your experiences in the game made helped you in taking on leadership roles in real-life or improved your leadership skills?

○ My experiences in the game haven't helped me at all in real life.

○ My experiences in the game have helped me a little in real life.

○ My experiences in the game have helped me a lot in real life.

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